SUPPLIMENTARY PRINT DRIVER SOFTWARE
FOR THE TASMAN CENTRONICS INTERFACE

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The supplimentary cassette contains a different print driver which you may find useful as an alternative to the driver software supplied by the manufacturers of the TASMAN hardware. This program does not normally come with the interface, but you get it as a bonus for buying the unit from me.

--Features--

The supplimentary driver offers three modes of operation. The default mode, which is what occurs when you first load the program up, is the standard LPRINT and LLIST mode. You should think of this as the #3 mode because the other two modes are accessed by using commands like:

    LPRINT #4 and
    LPRINT #5

You can use these keyboard commands just as you normally would with the TS2040 thermal printer with one exception. The TAB function when used with LPRINT is ignored. Dot matrix printers have separate horizontal tab commands which you can use if you need this option.

The driver program occupies just 255 bytes. It locates itself between the CHANNELS area and the PROGRAM area of memory. For this reason, this driver will not conflict with other machine code programs located in the more common areas above ramtop.

In setting itself up, the program utilizes the "streams and channels" capabilities of the TS2068. Channel #3, the normal Lprint and Llist channel, is redirected to this program's code rather than the ROM. In addition two new channels, #4 and #5 are created to handle lprinting in different fashions; all of which could prove to be useful in different circumstances.

On loading, the Program area of memory is bumped up 255 bytes. At this time I know of only one program which does not like this: HOT Z AROS. It is possible, however to use the tape version of Hot Z which does not juggle the program and channel areas of memory. Other potential problems in using this driver could crop up in a case where the Channels and Program areas have been altered. Also, programs which create their own streams could present difficulties, but these are problems which do not exist at present. The A&J MicroDrive does work with this driver.

--How to Load the Driver--

The program loads like any other basic tape. Before you load another program or before you key in a program of your own, load this driver software. Use the command:

    LOAD ""

The driver machine code is stored in a REM statement. This remains intact throughout the operation of the program, but the computer is made to ignore it by having the start of the program jacked up to just beyond the end of the program line which holds the code.

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--How to Use the Various Modes--
Examples of how you can use the default mode (mode #3) are:

```
LPRINT "HELLO THERE, BIG FELLA."
LPRINT A$
LPRINT .0125
LPRINT CHR$ 27
LPRINT X
LLIST 1000
```

All regular characters will be printed, and tokens (words like PRINT, FOR, RANDOMIZE, etc) will be spelled out.

Many big printers can be sent special codes which turn on various functions of the printer. It is beyond the scope of this paper to discuss different possible commands because different brands of printers often require their own unique instructions. READ THE MANUAL THAT COMES WITH THE PRINTER. It won't be easy, I've had my printer for 2 years and I'm still learning how to make the darn thing work. But you learn a lot if you take the time to read the manual and experiment.

In general, the codes which turn on special functions are sent to the printer in the same way you would send, say, the letter "A" to be smacked out on the paper. The difference is the code number. Function codes usually range from CHR$ 0 to CHR$ 31 while print codes range from CHR$ 32 to CHR$ 129. Most printers offer additional characters with codes from 129 to 255.

Whenever you LPRINT something to the printer, your computer sends a series of numbers to it. The printer looks at the number and decides if it is a character to be printed out or a command to be interpreted and executed.

If you look at the book that came with your computer (Appendix B, Page 239) you will see a list of all the characters the computer can handle. Along with the character itself is the CODE in the left hand column. Looking up the letter "A", you'll see the corresponding code of 65. Whenever you:

```
LPRINT "A"
```

your computer sends the number 65 to the printer. The printer, in turn, looks up the number 65 in a table it has and prints the letter "A" on the paper.

You'll note that the codes the printer interprets as commands (codes 0 to 31 in the book) are not used for printing characters on the TV. You can, however, send them to the printer. This can be done in several ways in the default mode.

```
LPRINT CHR$ 27 will send the number 27 to the printer.
```

When the printer receives it, it determines that this is a command and acts accordingly.

Mode #3 offers two other methods of sending function (or control codes) to the printer. The top row of the keyboard has 8 keys which print graphics characters on the TV screen when you put the computer into the Graphics mode by pressing SHIFT 9. The print driver will accept these characters and send control codes in their place. You have, therefore, 16 possible codes you can send when you call up the "G" cursor and press one of the graphic keys. You have 8 lower case graphics and 8 upper case graphics. The actual codes sent to the printer can be determined by looking at the following table:

2

Graphic on the number:	sends the code: lower/upper case		which is the ASCII: lower/upper case	
1	10	31	LF	US
2	11	30	VT	RS
3	12	29	FF	GS
4	24	08	CAN	BS
5	14	19	SO	DC3
6	15	11	SI	DC1
7	09	13	HT	CR
8	27	27	ESC	ESC

These codes are not fixed in granite. I'll show you how to change them a little further on.

CHR$ 27, the ESC (or ESCAPE) command is a very special command. It is always sent in conjunction with other codes to do things like change character pitch, underline, reverse linefeed, print bold characters, or any of a host of other niceties. With my Prowriter printer, I send a CHR$ 27, then the exclamation point to start printing in boldface type. Two separate codes are needed in order to turn the function on. Some functions require more codes than even two.

--Mode #3 Macro Commands--
The default mode of the printer driver lets you create Macro commands (commands consisting up to 8 separate codes). Just one code will send all eight out to the printer. You do this using the USER DEFINED GRAPHICS capabilities of your 2068. Create a UDG character consisting of the codes you wish to send to the printer. Then, when you lprint this character, each of the eight bytes which comprise the UDG character will be sent.

Suppose you want to send the codes necessary to make the printer start printing enlarged proportional underlined text. This would require 5 separate codes for the Prowriter, they are:
        14 to shift out (enlarged type)
        27 and 80 to select proportional spacing
        27 and 89 to turn on the underline mode

It is possible to define a graphics character that does it all in one fell swoop. The routine below lets you create your own UDG character that would be printed by the print driver when you type the letter selected when the computer is in Graphics mode (G-cursor):

```
10 REM Routine for creating UDG Macro Commands
20 INPUT "Type a letter A-U ";L$
30 PRINT L$
40 FOR X=0 TO 7
50 PRINT X;"---";
60 INPUT "Command Code? ";Y
70 PRINT Y
80 POKE USR L$+X,Y
90 NEXT X
```

RUN this program and select the letter "A" in response to the prompt in line 20. You'll next be asked to enter 8 command codes. These are the codes you want to execute. I would enter, for example the numbers: 14, 27, 80, 27, 89, 0, 0, 0 to make my Prowriter print enlarged underlined proportional characters.

After doing this, send the macro by getting the G-cursor and typing the letter "A". When it's Lprinted, the 8 separate codes go to the printer. Read more about User Defined Graphics in the TS2068 owner's manual.

--Mode #4 Operation--

Some printers have an extensive graphics character sets of their own which are accessed by sending codes greater than 128 in value. Whenever the default mode receives one of these codes, it spells out the token associated with that code.

To send the actual code without tokenizing, use the Lprint command just like usual, except specify mode 4 using the "#" symbol. For example:

LPRINT #4;" TO TO INK STEP STOP " (sends codes 204, 204, 217, 205, and 226)
LPRINT #4;CHR$ 200   (sends code 200)

Characters of any code value can thus be sent--not just those over 128. You can think of Mode #4 as the "raw ASCII" output driver. You have none of the frills of Mode #3 to get in the way of your programming. This mode could prove useful if you get into special graphics effects on your printer.

--Mode #5 Operation--

The third mode of operation is executed by using "#5" as a suffix to the LPRINT command. For example:

        LPRINT #5;A$

This mode sends regular character codes (that is, letters, numbers, and punctuation marks) as usual. You can also send control codes out via program line commands such as:

        LPRINT #5; CHR$ 14

In addition, you can "embed" control codes in a string of characters where other methods might be combersome. This is done by lprinting the up pointing arrow (symbol-shift H) followed by the two digit hex value for the code you wish to send. To send the SO or Shift Out command embedded in a string, for example, you could do it like this:

        LPRINT #5;"This is a test^0EThis is another test"

or

        LET A$="This is a test^0EThis is another test"
        LPRINT #5;A$

The hex number 0E equals 14 decimal which is the code for the Shift Out command. The up-arrow acts as a trigger to signal to the driver that the next two characters are digits of a hex number and are to be interpreted and sent as one code rather than two.

This method is used by my Pro/File 2068 program. In that environment it is not possible to send the graphics codes because they are used for other purposes. The up arrow trick retains the ability to send control codes to alter the printer.

--Mix N Match--

This print driver lets you perform quite elaborate tricks with your lprinting. I'll leave the experimenting to you, but here's an idea you might fool with. Try mixing different modes in the same lprint command. You can use a command like:

    LPRINT "Hello";#4; CHR$ 234;#3;A$

Also, the PRINT command which usually sends text to the TV can be connected to the print driver instead: PRINT "hello";#3;"good-bye"

Channel #3 is the same as the default mode when lprinting so PRINT #3 lprints rather than prints.

--How to Modify the Graphics Codes--

If you don't like my layout of codes sent by the graphics keys in Mode #3, you can change them fairly easily. Below is a table of addresses to Poke with the value of the code you wish each graphics character to represent.

Address	Key(lower case)	Address	Key(upper case)
26719	1	26732	1
26720	2	26731	2
26721	3	26730	3
26722	4	26729	4
26723	5	26728	5
26724	6	26727	6
26725	7	26726	7
26718	8	26733	8

The unshifted graphics on the "4" key will send the CANCEL command to the printer (Code 24). To change it, say, to a CARRIAGE RETURN command (Code 13), you would: POKE 26722,13

--How to Make Back Up Copies of the Driver--

First get the program into your computer by using the Merge Command. Type:
    MERGE "" and ENTER

After the load is complete, save it on a fresh tape using the following command:
    SAVE "printer"LINE 2

Make several copies and take good care of them. If you find the original tape is difficult to load, you may have better luck working with one of your own back-ups all the time. Read the notes in my catalog about adjusting your tape heads if you can't get the program to load at all. Since this program is a freebee, (for you, not for me) it is impossible for me to be able to send replacements for nothing.

Finally, I should note that it's possible to incorporate this driver into your own programs so you don't have two tapes to load. First load the driver into an empty computer using the MERGE technique shown above. Second, enter in the immediate mode (no line number):   POKE 23636,PEEK 23636+1

Third, LOAD your program that you want to use the print driver with. Fourth, type: POKE 23636,PEEK 23636-1

Finally, add the following line somewhere in the program where you know it will be executed before you try to lprint. This line needs only to be run once to; initialize the new streams and channels: RANDOMIZE USR 27961 26921

HAVE FUN!!!